

**ABSTRACT**

Methods and apparatus are disclosed for dynamic allocation and management of  
5 semaphores for accessing shared resources. These resources may be part of a computer or  
communications system or a network, such as, but not limited to a disk drive, printer,  
memory, file, database, code, data, etc., that can be allotted to a task while it is running.  
In one implementation, a semaphore manager maintains a data structure of resources  
having currently active resource requests and a list of each task requesting access and the  
10 particular type of access requested. When an access request is received for the first time  
for a resource, an entry is added to the data structure and access is authorized. Additional  
requests to access the resource may be received while the resource is allocated. If a new  
request for read access is received and the resource is currently under read access, access  
is granted and an entry is added to the data structure. Otherwise, the resource is currently  
15 unavailable, and access is either immediately denied or queued for possible future  
allowance during a specified, predetermined or forever duration. In one implementation,  
the semaphore manager uses semaphore primitives provided by an underlying operating  
system and assigns each resource request a semaphore received from the operating  
system. These semaphore values are maintained in the data structure, and may be used by  
20 the semaphore manager for fulfilling or timing out queued access requests. In this  
manner, access requests are made by a task based on an identifier of the resource (and not  
an identifier of a semaphore), and semaphores are dynamically allocated at runtime and  
only for those resources which are actually used.